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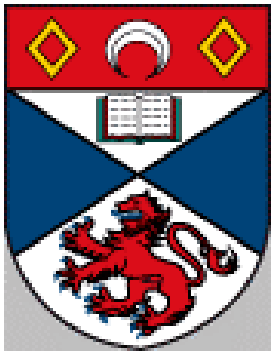

Welfare, Growth and Enviroment: a Sceptical Review of *The Skeptical Environmentalist* (Bjørn Lomborg, Cambridge University Press 2001)

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Welfare, Growth and Environment:
A Sceptical Review of *The Skeptical Environmentalist* (Bjørn Lomborg, Cambridge University Press, 2001)

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Abstract

In his wide ranging attempt to review the literature on economic development and welfare in relation to the environment, Lomborg claims balance and objectivity, but actually presents a thoroughly misleading picture of environmental prospects and research, global economic development, and the real determinants of human welfare. Statistician Lomborg blatantly distorts the evidence by systematically selecting statistics to support his claims that global welfare is generally improving and environmental policy is unnecessary, while denying catastrophic risks such as prolonged drought in major food growing areas (though such events cannot be ruled out by climate models). In spite of its numerous errors and biases, "the Lomborg scam" (as leading biologist E.O.Wilson aptly calls it) has been welcomed by gullible or like-minded journalists and politicians.

JEL classification: Q0, I3

Keywords: Lomborg, environmental optimism

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This apparently comprehensive survey of global economic and environmental trends claims to describe "the *real* state of the world" (p.1) with "the best possible and least myth-based knowledge" (p.33), based on "the official figures everybody uses" (p.31), with 173 graphs and 150 pages of notes and references. The main theme of this best-selling work is "that mankind's lot has vastly improved in every significant measurable field and that it is likely to continue to do so" (p.351), and that most environmental concerns are exaggerated, often based on distortion or even fabrication of the evidence. *The Economist* describes it as "one of the most valuable books on public policy…in the last ten years" (Sept.6, 2001). In contrast, expert scientific evaluation of Lomborg's unqualified claims shows that he has been highly selective in his survey, omitting crucial theoretical and empirical evidence that contradicts his most confident assertions. Leading biologist E.O. Wilson (2001) refers to "the Lomborg scam… characterised by wilful ignorance", in his discussion of extinction, and the eminent American climatologist S.H. Schneider (2001) "…raises questions about the role and responsibility of the publisher. Why did Cambridge University Press…publish a polemic under its imprimatur? Did CUP have the book competently reviewed?"

In this review, we concentrate on the environmental economics and policy conclusions, and also find similar faults with numerous errors, omissions and unsubstantiated claims.

Part I- The Litany

Lomborg sets the tone of his subsequent exposition by an extended initial castigation of prominent environmentalists' predictions that were confounded by unexpected later developments. While Lomborg recognises that predictions can excusably prove wrong, the poor forecasts of many in the environmental movement are claimed to be the result of relying on rhetoric and simplistic models instead of sound analysis (pp.29-30). However, Lomborg provides no criteria for determining what is an excusably inadequate predictive model. Most

economic forecasts turn out to be wildly inaccurate *ex post*, particularly in the long term and in the timing of their predictions. Since forecasters are continually revising and updating their forecasts to keep up with an ever-changing reality, this systemic inaccuracy tends to be overlooked. The emphasis on extreme and incorrect environmental predictions made decades ago by selected individuals and organisations seems implicitly designed to impugn all pessimistic assessments (described collectively as "the litany") by association, and presents a caricature of current environmental positions. Lomborg's rejection of pessimistic environmental projections, even when uncertainty is pervasive, contrasts with his frequent, unqualified extrapolations of upward sloping graphs of 'good' growth for decades into the future! It is also remarkable that there is no discussion of numerous cases where environmental and health concerns were finally vindicated after decades of deliberate deception by industries such as asbestos and tobacco. The meticulous documentation by Ehrlich and Ehrlich (1996) of how industry lobbies have misinformed the public, and corrupted both some scientists and many government agencies is not mentioned.

Throughout the book, Lomborg consistently argues that economic growth itself eventually generates an improvement in environmental quality as higher income augments the ability to pay for a cleaner environment (p.33). He supports this with reference to studies of the environmental Kuznets curve (EKC) that show an inverted U-shaped relationship between (local) pollutants and *per capita* income levels. In particular, Lomborg uses this model to explain declining levels of river pollution (p.203) and both indoor (p.183) and outdoor (p.178) air pollution in Western countries and to anticipate the same pattern for developing nations. In addition to solving pollution problems, Lomborg also relies heavily on the claim that economic growth is the answer to poverty (p.72). This is important given that poverty is the main reason for undernutrition (p.101) and lack of access to water resources (p.153). However, he assumes that growth trickles down to benefit the poor and that it does not significantly degrade or deplete the natural resource base on which the poor often rely, which is not always true (Dasgupta, 2001).

The problems with this approach are especially clear in the case of tropical deforestation. Lomborg underestimates the rate of loss, and then argues that as much tropical deforestation is attributable to individual poverty and poor government finances so economic growth, by relieving poverty, would diminish rates of deforestation (pp.113-114). However, he does not provide any evidence for this contention, overlooking explicit studies of the EKC hypothesis for tropical deforestation such as Koop and Toole (1999) among others. Summarising the empirical research, Barbier (2001) comments that the results are rather inconclusive and highly sensitive to model specification. An inverted-U shape relationship between change in forest stock and per capita GDP tends not to hold in aggregate for all countries, but may arise for particular regions. Moreover, for these regions, the turning point per capita income level, at which deforestation is zero, is between two and four times greater than average regional income. The implication is that considerable growth in GDP may be required to arrest deforestation, with a large negative impact on the forest stock meanwhile.

Part II- Human Welfare

This part considers "the most important" (p.45) aspects of human welfare that can be summarised statistically, and claims that all of them have been improving fairly steadily since records began, including obvious cases such as life expectancy, infant mortality and per capita income. However, there are important weaknesses in the discussion:

Inequality: Income or GDP comparisons between developed and developing countries are notoriously difficult, and Lomborg's typically unqualified assertion that global inequality in real PPP income has been declining is contradicted by research from the World Bank (2002). In fact, real incomes in the less globalised developing countries with a third of the world's population have been *declining* for the last decade, thus increasing the gap with the rich -and the more globalised developing -countries, though the latter two groups have been converging. He also fails to note the evidence that inequality *within* most countries has

increased or at best stagnated for the last two decades (Galbraith and Berner, 2001), while global individual income inequality has also increased (Milanovic, 2002).

Health: Although "victory over infectious diseases" (except HIV) is proclaimed (p.56), there is no mention at all of the most serious medical problem to emerge since the discovery of antibiotics, namely the rapid evolution of antibiotic resistance in some of the most dangerous infections. In particular, multi-drug resistant tuberculosis (MDR-TB) has spread from Russia to most countries in the West. While conventional TB is curable with antibiotics, it is already killing more people than ever before, and is now "the leading infectious disease killer of adults" (Reichman and Tanne, 2001). TB is still primarily a disease of poverty and destitution, but is now spreading from the worst areas of London and other centres, and many sufferers receive inadequate treatment, which then leads to MDR-TB. If not fatal, this requires up to two years of very expensive treatment. Experts such as Reichman warn of an impending global epidemic. Multiple drug resistant Staphylococcus aureus (MRSA) has also become a major and much discussed cause of serious hospital infections, and varieties have been observed that respond to no known antibiotic. Another problem ignored by Lomborg is the rapid growth of mental illness including clinical depression in industrial countries. Oliver (1998) analyses the increased incidence of these afflictions in Britain, which are not just due to better diagnosis.

GDP and welfare: Lomborg identifies simplistic accounting measures of material prosperity such as GDP with welfare, neglecting the extensive research that shows reported happiness or satisfaction with life does *not* increase over time in advanced economies as average real incomes rise (Frey and Stutzer, 2001). In surveys of a cross-section of the population of developed countries, there is a small positive correlation between income and reported happiness, particularly for those below the median income, but other factors such as family, separation, work and friendship are more important for those above the poverty line (Lane, 1999). 'Positional competition' for prizes such as the best jobs in a "winner take all" society

leaves most people who do not win the prize just “running faster to stand still” (Frank, 1999). In view of these results, it is astonishing that Lomborg does not mention the rapid increase in family breakdown and divorce in industrial countries in recent decades, as well as growing teen-age alcohol and drug abuse, crime and pregnancy, in his supposedly balanced account of “unprecedented human prosperity”(p.87).

Lomborg’s misrepresentation of the nature and determinants of welfare cannot be ascribed exclusively to ignorance of the relevant literature, for later in his discussion of global warming he actually criticises the latest official Intergovernmental Panel on Climate Change (IPCC, 2001), for quite appropriately noting the lack of a “clear link between level of GNP and quality of life (or satisfaction) beyond certain thresholds”. Lomborg then even asserts that the above “absence of a link between income and happiness is incorrect”(p.320), due to a positive though decreasing effect of income. But the positive relationship for relative income holds only in the cross-sectional results, which are not mentioned explicitly, while the absence of a positive link between income and satisfaction is found in all of the numerous time-series studies referred to by the IPCC, and for women in the US happiness is actually decreasing! Lomborg only directly references two quite outdated studies of this crucial issue.

Lomborg’s defence of traditional GDP accounting as an accurate indicator of wealth and social well-being (pp.68-69) focuses on traditional measurement issues regarding non-market production, the shadow economy and defensive expenditures. However, this measure ignores the depreciation of capital assets, especially the depletion of natural resources which points to the *unsustainability* of growth patterns in many poor countries. Lomborg shows no awareness of the modern economics of sustainability, ignoring the extensive literature on environmental damage and the depreciation of natural capital. His exceptionally brief consideration of the measurement of sustainable development amounts to one graph (p.33) that plots a positive linear relationship between per capita GDP and the World Economic Forum’s new Environmental Sustainability Index. But there is no discussion of the latter’s

limitations (Wackernagel, 2001). Nor does Lomborg explain why he chooses to ignore alternative indices of macroeconomic sustainability, such as those surveyed by Hanley (2000). In particular, he overlooks the genuine saving (or genuine investment) measure of weak sustainability proposed by Pearce and Atkinson (1993) and now systematically estimated by the World Bank as one of their development indicators. Genuine saving is calculated as gross saving net of the depreciation of human capital, man-made capital and natural resources. A negative value indicates net *disinvestment* in the capital base and so declining national wealth. Applying this method, Dasgupta (2001, pp.156-161) finds falling per capita wealth between 1970 and 1993 for the poorest third of the world's population, in spite of growing measured GDP per head in many poor countries.

Lomborg's methodology throughout is to select statistics that suggest improving welfare, and to neglect any contrary indicators. Thus he notes that murder rates have dropped since the 19th century, but makes no mention of the fact that violent crimes against the person have increased dramatically in industrial countries (except Japan) over most of the last half century. Similarly, he extols declining hours of work and increasing leisure, although working households have actually been losing leisure over the last two decades as more women enter the labour market (mainly from working households), while the proportion of workless households has been growing, particularly in the UK. The only negative trend mentioned in Lomborg's Panglossian worldview is that "with increasing urbanization the suicide rate has grown dramatically" (p.85), but there is no attempt to reconcile this trend with his claims of ever increasing welfare.

Part III –Can human Prosperity continue?

These chapters ostensibly address the question of whether current development is sustainable. Without ever defining criteria by which sustainability can be evaluated, Lomborg discusses a number of potential future problems such as adequate food production, deforestation, and possible shortages of energy and other non-renewable resources. As usual, Lomborg

anticipates no scarcities arising, thanks to simple extrapolation of past high rates of technological progress into the foreseeable future (Grubb, 2001). Advances in technology and its diffusion, for example, will ensure rising agricultural productivity to feed a growing population (p.108). However, this is to minimise some serious concerns.

In particular, the vulnerability of modern high-yield and high external input agriculture to adverse climatic developments is an important issue widely discussed in the literature (Pretty, 1995), but not mentioned by Lomborg. Thus he predicts continuing growth of per capita food production in China while ignoring all the environmental problems in that country reviewed by Mirsky (2001), where severe water shortages and a rapidly declining water table in the North are threatening continued agricultural productivity. If an event like the three year drought that has devastated central Asian agriculture were to hit China's main food growing provinces, the subsequent demand for imports would send world grain prices skyrocketing and condemn hundreds of millions of the world's poorest people to starvation. And what if the main grain surplus exporting areas of North America were similarly and simultaneously afflicted? All these are events that cannot be ruled out by any of the current climate models, and indeed IPCC (2001, p.774) notes "an increased chance of drought for mid -continental areas during Summer" as one of its "most robust conclusions".

Soil erosion (and desertification of fertile areas) is another non-problem according to Lomborg, because increased use of chemical fertilizers and pesticides and other advances are more than compensating for any loss of agricultural productivity due to erosion, and will of course continue to do so indefinitely into the future! The crucial point that is omitted here is the loss of soil organic matter in chemical-intensive agriculture, where nutrients are supplied but soil structure loses stability and becomes more susceptible to erosion. In particular, adverse climatic change such as aridity or flooding can precipitate soil loss that beyond some threshold does dramatically reduce yields, and may result in desertification that is essentially irreversible without major investment.

Part IV Pollution

Turning to air pollution, Lomborg documents declining levels in the UK and US in recent decades, a trend he expects to continue despite increasing traffic in cities. However, the first study of total pollution in the 14 largest British cities from 1992-97 by Walter and FitzRoy (2000) finds no time trend, contrary to the impression of ongoing decline given by Lomborg. He does provide a single paragraph on the extraordinarily high pollution concentrations in developing-country cities (p.175), but no indications of their growth over time. Instead, he predicts they will follow western experience and reduce pollution with rising real income. Once again this optimism neglects opposing evidence, particularly from the high priority given to motorization by developing countries that is likely to outweigh technological progress, just as it has in recent years in the UK and elsewhere.

In this section, indoor pollution from dirty cooking fuel is correctly emphasised as a major problem in developing countries (p.183). However, the rapid growth of allergies in industrial countries (with the exception of asthma) is dismissed with little evidence as largely subjective.

Part V - Tomorrow's problems

The final part is undoubtedly the most controversial, addressing the link between chemicals and cancer, and the issues of biodiversity and global warming.

The author begins by claiming that chemicals in the environment pose no threat because age-and smoking- adjusted cancer death rates have been declining in advanced countries. He makes no mention of the rapidly growing expenditures on medical care needed to achieve these reductions, and there is only a brief mention of the increasing (age-adjusted) *incidence* of some cancers. This is put down exclusively to improved diagnosis, although it is difficult to identify truly increasing incidence precisely because diagnostic technology improves. Several studies find very low death rates from cancers caused by pesticide residues in food, but because of the long time-lags and rather uniform exposure to these residues across a population, it is again hard to identify their effects, particularly on the

incidence of allergies, cancers or other conditions, when so many relevant variables are changing over time. These statistical problems are not considered by Lomborg. The overwhelming importance of smoking and dietary factors is of course undisputed.

While he attacks Rachel Carson's (1962) classic *Silent Spring* for inaccurate predictions about cancer, Lomborg fails to mention the decimation of numerous, once common song-bird populations in Britain and other countries through intensive agriculture that was correctly foreseen in her title. Nor does he acknowledge the role of pioneers such as Carson in generating the legislation behind the environmental clean-up that has occurred, in spite of the systematic efforts of the chemical industry to discredit her work and that of many other environmental scientists and activists since (Ehrlich and Ehrlich, 1996).

Another remarkable omission in Lomborg's account of pesticides is his failure to mention their devastating effects on the health of farmers using these highly toxic products in developing countries without protective clothing or, often, the ability to read instructions and warnings. He claims 20 annual fatalities from pesticide use worldwide (p.248), though Wilson and Tisdell (2001) cite an FAO estimate of 200,000 annual deaths from pesticide poisoning, and report a contingent valuation cost estimate "of more than 2 1/2 months income a year due to ill health resulting from exposure to pesticides" in a sample of farmers in Sri Lanka. They also show that while yields rise initially with chemical inputs, pesticides also destroy natural predators, and resistant strains of pests evolve, thus requiring increasing applications to maintain output. Individual farmers in such an environment are locked into an inferior Nash equilibrium with a destructive technology, because biological or integrated pest management (IPM) is not viable when beneficial predators are destroyed by spillovers from neighbouring pesticides. On the other hand, large scale IPM has raised yields and reduced chemical use in Indonesia and other countries when there is a political commitment to counter the intensive marketing and misinformation by agribusiness and support more sustainable agriculture (Pretty, 1998; Cowan and Gunby, 1996).

In developed countries, use of pesticides is encouraged by supermarkets' refusal to accept produce with superficial, 'cosmetic' blemishes that do not affect taste or nutritional value, thus handicapping independent organic growers. Lomborg (pp.246-7) claims huge losses from pesticide reduction, but does not discuss sustainable agriculture. Evidence from many countries summarised by Pretty (1998) shows that after a transitional period of reduced yields, substitution of labour for chemical inputs with appropriate management skills and IPM can restore productivity and allow sustainable, competitive farming. Removal of the many perverse government and CAP incentives and implicit subsidies for intensive, unhealthy farming (that generates large external costs), in favour of support for transition to sustainable methods would have major long term benefits (Humphreys, 2001). Local markets and direct selling to consumers can already supply organic produce at prices comparable to supermarket prices for conventional food products in many areas, in spite of all the explicit and implicit subsidies received by the large retail chains (Monbiot, 2001).

Biodiversity and species extinction is a contentious area where Lomborg first accuses leading biologists of exaggerating evidence for high rates of extinction, and then claims, "on the basis of information from Great Britain", an extinction rate of only "about 0.7 percent per 50 years" (p.255). Since most species are currently *unknown* insects in the most-threatened tropics (not in Britain), there is far too much uncertainty for "such long and broad projections on such a thin and lopsided base of data", as Gibbs (2001, p.35) points out in a detailed review. With estimates of five to 15 million species today, mostly unclassified, observing extinctions is "extremely difficult". The consensus among experts is that Lomborg's estimate is an order of magnitude lower than the likely (conservative) current rate of extinction (Wilson, 2001). The many well-known *endangered* species are ignored by Lomborg, though "biologists have some good theoretical reasons to fear that even if mass extinction hasn't begun yet, collapse is imminent"(Gibbs, p.35).

The most substantive chapter addresses global warming and does at least offer some detailed analysis of climate models and some of their limitations but again, by crucial

omissions, Lomborg distorts the evidence on future warming, its likely effects, and the appropriate responses. Climate modelling limitations and uncertainties now require forecasters to project a range of global mean temperature increases over the next century, and Lomborg presents a number of arguments for the lower end of the current IPCC range of 1.4-5.8 C. However he does not consider feedback from the biosphere, such as enhanced release of methane from wetlands or methane hydrate deposits in coastal waters, which could accelerate global warming.

In any case, global mean temperatures have little significance without knowing the regional distribution of temperature and rainfall and, as Lomborg points out, "because the computer models still have difficulty producing reliable regional predictions it is difficult to define the effects as regards individual countries"(p.288). And while it is obvious that "higher temperatures might…increase the risk of drought"(p.300), he completely ignores the possibility of prolonged drought suddenly and catastrophically afflicting major food producing areas of Asia or North America. Instead, Lomborg asserts categorically and without qualification that "global warming will not decrease food production" (p.317), apparently because he knows that past rates of productivity growth will continue to match population growth over the next 100 years! Thus despite the modelling limitations and uncertainties recognised by Lomborg, he still appears to be certain that "there is no ecological catastrophe looming" (p.348), so he can dismiss the 'precautionary principle' as having no particular relevance for global warming. The possible interruption of the North Atlantic Gulf Stream circulation by warming and resulting polar meltwater, which could rapidly reduce Northwest Europe's mean temperature by several degrees celsius, (as actually happened at the end of the last ice age), is discounted as "not…catastrophic"(p.316).

While the Nordhaus and Boyer (2000) climate change model (RICE-99) favoured by Lomborg attempts to factor in the potential for high damages, significant adjustments for the most probable catastrophe of prolonged drought in major growing areas (and its impact on food prices and the world's poor) are neglected, leading to an inefficient degree of

precaution. Instead, only the low probability ocurrence of permanent high income-loss is considered. As well as adding a risk premium to the social cost of risk, scientific uncertainties can be incorporated within a cost-benefit framework by including the foregone option values of irreversibilities and by applying a smaller discount rate to distant damages to account for uncertainty about the welfare of future generations. These factors would favour greater investment in precaution (Gollier, 2001).

In terms of policy, Lomborg sensibly proposes increased R&D spending on renewable energy sources to combat global warming, but he denies the need for any other new environmental policies, and even makes the absurd claim that most of the improvements he documents (such as air quality in London) are *not* the result of legislation (such as the 1956 Clean Air Act). As Grubb (2001) points out, "The huge improvements in London's air have been very much driven by policy….The dramatic impact evidence from 1957 onwards is obvious in Lomborg's own graph. His denial of the fundamental cause is, at best, inexcusable ignorance…The list of environmental improvements driven by public concerns and policies is almost endless, and, I suspect these explain most of the environmental recoveries Lomborg charts".

The other main argument against substantial 'insurance spending' to reduce greenhouse gas emissions and stabilise global warming is based on a gross misrepresentation of the economic costs. Lomborg quotes studies of environmental taxation to reduce emissions that claim considerable output and welfare losses, even when these tax receipts are used to reduce other distortionary taxes. However he does not notice that these studies all make highly unrealistic assumptions, such as no unemployment. When there is unemployment and benefits are taxed at a lower rate than wages, some gradual shifting of the tax burden from labour to fossil fuel energy can reduce both pollution and unemployment- the 'double dividend' that is denied by Lomborg and the early, unrealistic models (Bonetti and FitzRoy, 1999; Koskela and Shoeb, 1999). While *sudden* increases in energy prices or taxes do retard growth, countries with traditionally high energy prices have benefited from

technological advances in the development of alternatives. Investment in public transport and large scale urban pedestrianisation have dramatically improved the quality of life in many European cities, as well as reducing energy use, but are always initially opposed by the road lobby. Alternative technologies and conservation measures have hitherto received only minimal government support, but also complement environmental taxes and reduce their cost. Thus even without international agreement, greenhouse emissions can be reduced as a by-product of improving the urban environment.

By simply denying the existence of major environmental risks, and exaggerating the costs of precautionary or insurance policies to limit global warming, Lomborg can portray such policies as irrational. Since the scientific basis is underdeveloped and controversial, and people differ widely in their attitudes to risk, and their intrinsic valuation of the environment, it is difficult to reach a 'rational' consensus on policy. It is thus easy for industry lobbies such as the Global Climate Coalition to discredit any particular precautionary measures that would reduce their current profitability, on the basis of both genuine uncertainty as well as selective presentation of the evidence. In this they also profit from the errors and omissions in academic attacks on environmental policies such as Lomborg's.

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